

Xerox Docket No. D/97317

**PATENT APPLICATION**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Cathie J. BURKE et al.

Group Art Unit: 1756

Application No.: 10/046,245

Examiner: D. Chacko Davis

Filed: January 16, 2002

Docket No.: 106452

For: METHODS OF PATTERNING RESISTS AND STRUCTURES INCLUDING THE  
PATTERNED RESISTS

**REQUEST FOR RECONSIDERATION**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

In reply to the November 24, 2003 Office Action, reconsideration of the rejections is respectfully requested in light of the following remarks.

Claims 1-26 are pending in this application. Claims 10, 11, 25 and 26 have been withdrawn from consideration.

Applicants appreciate the courtesies extended to Applicants' representative during the personal interview conducted on February 10, 2004. Applicants' separate record of the substance of the interview is incorporated into the following remarks.

An Information Disclosure Statement with Form PTO-1449 was filed with the application on January 16, 2002. Applicants have not yet received back from the Examiner a copy of the Form PTO-1449 initialed to acknowledge the fact that the Examiner has considered the cited information. The Examiner is requested to initial and return to the undersigned a copy

of the subject Form PTO-1449. For the convenience of the Examiner, a copy of that form is attached.

Rejections Under 35 U.S.C. §103(a)

A. Imai in view of Feely

The Office Action rejects claims 1-9, 12, 14 and 16-24 under 35 U.S.C. §103(a) over U.S. Patent No. 6,368,754 to Imai ("Imai") in view of U.S. Patent No. 5,344,748 to Feely ("Feely"). Applicants respectfully traverse the rejection.

Imai would not have rendered obvious the inventions of claims 1, 12 and 18. Feely does not remedy the deficiencies of Imai. Claim 1 recites "[a] method of patterning a resist, comprising... providing a patterned mask comprising at least one transparent region, at least one partially transmissive region and at least one opaque region... wherein the mask controls the amount of radiation transmitted onto the resist to be substantially uniform over substantially the entire portion of the surface of the resist that is irradiated...." Claims 12 and 18 include similar recitations. Imai and Feely do not teach or suggest such methods or patterned resists.

The Office Action asserts that Imai discloses a method of patterning a resist including using a reticle having first and second masks. The Office Action concedes that Imai does not disclose a mask including at least one transparent region, at least one partially transmissive region and at least one opaque region. However, the Office Action asserts that this deficiency is overcome by Feely's teaching of a photomask including partially and fully transmissive regions. Notwithstanding the Office Action's assertions, Imai and Feely do not teach or suggest methods employing a patterned mask comprising at least one transparent region, at least one partially transmissive region and at least one opaque region wherein the mask controls the amount of radiation transmitted onto the resist to be substantially uniform over

substantially the entire portion of the surface of the resist that is irradiated -- or devices manufactured by such methods.

As admitted in the Office Action, Imai does not teach or suggest employing a patterned mask comprising at least one transparent region, at least one partially transmissive region and at least one opaque region. Imai discloses a reticle including two masks. The two masks have different sized features. In operation, the first mask is positioned over a substrate and then the substrate is illuminated. The reticle is then moved horizontally to position the second mask over the substrate and the substrate is again illuminated. Imai does not teach or suggest providing multiple areas of differing exposure through use of a single mask. Imai instead teaches using a reticle having multiple masks. In addition, Imai does not teach or suggest a method in which the mask controls the amount of radiation transmitted onto the resist to be substantially uniform over substantially the entire portion of the surface of the resist that is irradiated. Imai does not provide any disclosure regarding the length or intensity of exposure or control of those parameters. Imai merely teaches that two masks having apertures of differing sizes can be used.

Feely does not remedy the deficiencies of Imai. Feely, like Imai, fails to provide any teaching or suggestion of a method in which the mask controls the amount of radiation transmitted onto the resist to be substantially uniform over substantially the entire portion of the surface of the resist that is irradiated. The method of Feely provides for selective irradiation of a photosensitive material to render complex three dimensional features in that material. The instant invention, by contrast, provides for uniform irradiation of a resist. By employing the methods of the present invention, a resist having a substantially uniform topography is achieved -- thus eliminating the need for costly, time-consuming post-patterning processing steps. Imai and Feely do not recognize the need for resists having

substantially uniform topography, and do not teach or suggest methods for obtaining such resists. For the foregoing reasons, a *prima facie* case of obviousness has not been made.

Claims 1, 12 and 18 would not have been rendered obvious by Imai and Feely.

Claims 2-9, 14, 16, 17 and 19-24 each depend from one of claims 1, 12 and 18, and thus also would not have been rendered obvious by the cited references. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

B. Imai in view of Feely and Convers

The Office Action rejects claims 13 and 15 under 35 U.S.C. §103(a) over Imai in view of Feely and U.S. Patent No. 5,485,181 to Convers ("Convers"). Applicants respectfully traverse the rejection.

Imai does not teach or suggest the method of claim 12. Feely and Convers do not remedy the deficiencies of Imai. Claim 12 recites "A method of making an ink jet print head, comprising... providing a patterned, multi-transmissive mask comprising at least one transparent region, at least one partially transmissive region and at least one opaque region... wherein the mask controls the amount of radiation transmitted onto the resist to be substantially uniform over substantially the entire portion of the surface of the resist that is irradiated." Imai, Feely and Convers would not have rendered obvious such a method.

The Office Action asserts that Imai and Feely would have rendered claim 12 obvious, and cites Convers for its teaching of the particular ink jet components recited in claims 13 and 15. However, notwithstanding Convers' teachings relating to ink jets, none of Imai, Feely and Convers teach or suggest a method including providing a patterned, multi-transmissive mask comprising at least one transparent region, at least one partially transmissive region and at least one opaque region wherein the mask controls the amount of radiation transmitted onto a

resist to be substantially uniform over substantially the entire portion of the surface of the resist that is irradiated, as recited in claim 12.

For the reasons discussed above, neither Imai nor Feely teaches or suggests the method of claim 12. Convers discloses a method of improving the durability of ink jet printheads by interposing a sulfur-containing adhesion promoter between a top plate and a photoresist. Convers includes no teaching or suggestion regarding use of a mask that provides for selective exposure of a resist, much less that such mask controls the amount of radiation transmitted onto the resist to be substantially uniform over substantially the entire portion of the surface of the resist that is irradiated. For at least these reasons, Imai, Feely and Convers do not teach or suggest the method of claim 12.

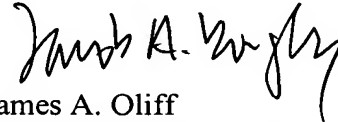
Claim 12 would not have been rendered obvious by Imai, Feely and Convers. Claims 13 and 15 depend from claim 12, and thus also would not have been rendered obvious by the cited references. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

#### Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-26 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



James A. Oliff  
Registration No. 27,075

Jacob A. Doughty  
Registration No. 46,671

JAO:JAD/hs

Attachment:  
Form PTO-1449

Date: February 11, 2004

**OLIFF & BERRIDGE, PLC**  
**P.O. Box 19928**  
**Alexandria, Virginia 22320**  
**Telephone: (703) 836-6400**

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